

REMARKS

Applicants will address each of the Examiner's objections and rejections in the order in which they appear in the Office Action of April 4, 2002.

Election/Restrictions

In the Office Action, the Examiner requests affirmation of the telephonic election in this response. Applicants elect to prosecute Group I: Claims 1-7 and 11-42 in this application. Applicants are making this election without prejudice to later filing a divisional application on the non-elected claims.

Claim Rejections - 35 USC §103

The Examiner rejects Claims 1-7, 11-16, 18-23 and 25-42 under 35 USC §103 as being unpatentable over Hamada in view of Tang et al. The Examiner also rejects Claims 17 and 24 under 35 USC §103 as being unpatentable over Hamada in view of Tang et al. and further in view of Shi et al. These rejections are respectfully traversed.

The present invention, as claimed, is directed to a self-light-emitting device. As explained at pages 1-2 of the present application, in prior self-light-emitting devices, the surface on which the light emitting or EL material is formed is not planarized. As a result, the thickness of the formed EL layer is not even. If a portion of the EL layer becomes too thin or disconnected, the cathode and anode formed with the EL layer will be short-circuited. When the cathode and anode are short-circuited, electric current intensively flows between the cathode and anode, and almost no electric current flows through the EL layer. As a result, the EL layer is not able to emit light.

The claimed invention overcomes this problem. More specifically, the invention claimed in independent Claims 1-4 and 15 is directed to a self-light-emitting device having at least one pixel electrode and a light emitting layer over the pixel electrode. The pixel electrode comprises an electrode hole which is filled up with an insulator comprising an organic resin. As a result, the surface of the pixel electrode is planarized, and there is no portion of the light emitting layer which is extremely thin or disconnected. Therefore, there is no part where an anode and a cathode, having the light emitting layer therebetween, are short-circuited. As a result, the light emitting layer emits light effectively. Figs. 1A-1C of the present application illustrate an example of such a structure. See also pages 2-5 of the application.

None of the cited references disclose or suggest such a structure. For example, Tang discloses using a passivation film of silicon dioxide, not an insulator of an organic resin as recited in the claims of the present application.

Accordingly, for at least the above-stated reasons, independent Claims 1-4 and 15, and those claims dependent thereon, of the present application are patentable over the cited references.

Independent Claims 5, 11 and 22 are also directed to a self-light-emitting device. Claim 5 requires an insulator formed in each space between pixel electrodes while Claims 11 and 22 require an insulating layer formed in the gap between pixel electrodes. Applicants do not believe that any of the cited references disclose such features nor has there been a showing by the Examiner of where such features might be found in the references. Accordingly, these independent claims and the claims dependent thereon are also patentable over the cited references.

Therefore, it is respectfully requested that the rejection of the claims over these references be withdrawn, and the claims allowed.

New Claims

Applicants are adding new dependent claims 43-84 to further claim the present application.

As each of these claims is a dependent claim, it is respectfully submitted that they are allowable for at least the reasons discussed above for the independent claims.

The fee for new claims has been calculated as shown below.

	Claims Remaining After Amendment		Highest Number Previously Paid For	Present Extra	Rate	Fee
Total	81	-	42	39	(small entity) x 9 (others) x 18	\$702.00
Independent	8	-	11	0	(small entity) x 42 (others) x 84	\$0.00
Multiple Dependent (First Presentation)					(small entity) + 140 (others) + 280	\$0
TOTAL ADDITIONAL FEES						\$ 702.00

Applicants are enclosing the \$702.00 fee for the new claims.

IDS

In the Office Action, the Examiner has marked on Applicants' 1449 Forms that a number of references were "not provided." Applicants submitted these references with each of the IDSs submitted. Apparently, the references were lost between the PTO mail office and the Examiner. Accordingly, it is believed that the Examiner did not consider these references in his examination. Therefore, Applicants are providing a new copy of each of these references with the enclosed IDS

and a new 1449 form. As these references have already been previously submitted, it is requested that they be examined.

As Applicants are also submitting a new reference, U.S. 6,246,179, in the IDS, Applicants are submitting a check for \$180 with the IDS.

It is respectfully requested that the Examiner consider all of these references when responding to this Amendment.

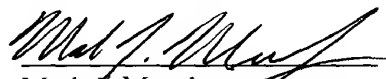
Conclusion

For at least the above-stated reasons, it is respectfully submitted that the present application is now in condition for allowance and should be allowed.

If any further fee is due for this amendment, please charge our deposit account 50/1039.

Favorable reconsideration is earnestly solicited.

Respectfully submitted,


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Marked-up copy of the claims as amended:

IN THE CLAIMS:

Please amend the claims as follows:

1.(Amended) A self-light-emitting device [having an EL element, said EL element]
comprising:

a TFT;

a pixel electrode [electrically connected to] over said TFT;

[an EL] a light emitting layer [formed on] over said pixel electrode; and

a cathode [formed on] over said [EL] light emitting layer,

wherein said pixel electrode comprises an electrode hole which is filled up with an insulator
comprising an organic resin, and

wherein said pixel electrode is connected to said TFT.

[wherein a protective portion formed of an insulator is provided in an electrode hole.]

2.(Amended) A self-light-emitting device [having an EL element, said EL element]
comprising:

a TFT;

a pixel electrode [electrically connected to] over said TFT;

[an EL] a light emitting layer [formed on] over said pixel electrode; and

a cathode [formed on] over said [EL] light emitting layer,

wherein said pixel electrode comprises an electrode hole which is filled up with an insulator
comprising an organic resin.

wherein said pixel electrode is connected to said TFT, and

wherein [a protective portion provided] said insulator in [an] said electrode hole is sandwiched between said pixel electrode and said [EL] light emitting layer.

3.(Amended) A self-light-emitting device [having an EL element, said EL element] comprising:

a TFT;

a pixel electrode [electrically connected to] over said TFT;

[an EL] a light emitting layer [formed on] over said pixel electrode; and

a cathode [formed on] over said [EL] light emitting layer,

wherein said pixel electrode comprises an electrode hole which is filled up with an insulator comprising an organic resin.

wherein said pixel electrode is connected to said TFT, and

wherein [a protective portion provided in an electrode hole is formed of an insulator and] said [EL] light emitting layer is also formed [on] over [surfaces] a surface of [said pixel electrode and] said [protective portion] insulator.

4.(Amended) A self-light-emitting device [having an EL element, said EL element] comprising:

a TFT;

a pixel electrode [electrically connected to] over said TFT;

[an EL] a light emitting layer [formed on] over said pixel electrode; and

a cathode [formed on] over said [EL] light emitting layer,

wherein said pixel electrode comprises an electrode hole which is filled up with an insulator

comprising an organic resin,

wherein said pixel electrode is connected to said TFT, and

wherein said [EL]light emitting layer and [a protective portion] said insulator are sandwiched between said pixel electrode and said cathode.

5.(Amended) A self-light-emitting device [having an EL element, said EL element] comprising:

a plurality of [TFT] TFTs;

a plurality of pixel [electrode] electrodes [electrically connected to] over said [TFT] TFTs;

[an EL]a light emitting layer [formed on] over said pixel [electrode] electrodes; and

a cathode [formed on] over said [EL]light emitting layer,

wherein said pixel electrodes are connected to said TFTs, respectively, and

wherein a plurality of said pixel electrodes are formed in a pixel portion and [a protective portion] an insulator is formed in [a] each space between said pixel electrodes.

6.(Twice Amended) A self-light-emitting device according to claim 1, wherein a surface of said pixel electrode and a surface of said [protective portion] insulator are planarized to be flush with each other.

Cancel claims 8-10.

11.(Amended) A [self-light emitting] self-light-emitting device comprising:

at least two first electrodes formed over a substrate with a gap between said first electrodes;

an insulating layer formed in the gap between said first electrodes;
a[n EL] light emitting layer formed [on] over said first electrodes and said insulating layer;
and
a second electrode opposed to said at least two first electrodes with said [EL] light emitting layer interposed therebetween.

12.(Amended) The [self-light emitting] self-light-emitting device according to claim 11 wherein said first electrodes function as an anode while said second electrode functions as a cathode.

13.(Amended) The [self-light emitting] self-light-emitting device according to claim 11 wherein said self-light emitting device is a passive display device.

14.(Amended) The [self-light emitting] self-light-emitting device according to claim 11 wherein said [EL] light emitting layer comprises an organic [electroluminescence] material.

15.(Amended) A [self-light emitting] self-light-emitting device comprising:
at least one switching element;
at least one interlayer insulating film formed over said switching element;
a contact hole opened in said [switching element] interlayer insulating film;
a pixel electrode formed [on] over said interlayer insulating film and electrically connected to said switching element through said contact hole;
an insulating layer comprising an organic resin formed on a portion of said pixel electrode in said contact hole;

[an EL] a light emitting layer formed [on] over said pixel electrode and said insulating layer;
and

a second electrode formed [on] over said [EL] light emitting layer.

16.(Amended) The [self-light emitting] self-light-emitting device according to claim 15
wherein said switching element comprises a thin film transistor.

17.(Amended) The [self-light emitting] self-light-emitting device according to claim 15
wherein said switching element comprises a transistor formed within a silicon substrate.

18.(Amended) The [self-light emitting] self-light-emitting device according to claim 15
wherein said pixel electrode is an anode while said second electrode is a cathode.

19.(Amended) The [self-light emitting] self-light-emitting device according to claim 15
wherein said pixel electrode is a cathode while said second electrode is an anode.

20.(Amended) The [self-light emitting] self-light-emitting device according to claim 15
wherein said [EL] light emitting layer comprises at least one organic [EL layer] material.

21.(Amended) The [self-light emitting] self-light-emitting device according to claim 15
wherein [said] a surface of said insulating layer is substantially flush with a surface of said pixel
electrode.

22.(Amended) A [self-light emitting] self-light-emitting device comprising:

- at least first and second switching elements;
- at least one interlayer insulating film formed over said first and second switching elements;
- at least first and second pixel electrodes formed over said interlayer insulating film wherein said first and second pixel electrodes are electrically connected to said first and second switching elements, respectively;
- an insulating layer formed in a gap between said first and second pixel electrodes;
- [an EL] a light emitting layer formed [on] over said first and second pixel electrodes and said insulating layer; and
- a third electrode formed [on] over said [EL] light emitting layer opposed to said first and second pixel electrodes.

23.(Amended) The [self-light emitting] self-light-emitting device according to claim 22 wherein said switching element comprises a thin film transistor.

24.(Amended) The [self-light emitting] self-light-emitting device according to claim 22 wherein said switching element comprises a transistor formed within a silicon substrate.

25.(Amended) The [self-light emitting] self-light-emitting device according to claim 22 wherein each of said first and second pixel electrodes is an anode while said third electrode is a cathode.

26.(Amended) The [self-light emitting] self-light-emitting device according to claim 22

wherein each of said first and second pixel electrodes is a cathode while said third electrode is an anode.

27.(Amended) The [self-light emitting] self-light-emitting device according to claim 22 wherein said [EL] light emitting layer comprises at least one organic [EL layer] material.

28.(Amended) The [self-light emitting] self-light-emitting device according to claim 22 wherein a surface of said insulating layer is substantially flush with a surface of said first and second pixel electrodes.

35.(Amended) A self-light-emitting device according to claim 2, wherein a surface of said pixel electrode and a surface of said [protective portion] insulator are planarized to be flush with each other.

36.(Amended) A self-light-emitting device according to claim 3, wherein a surface of said pixel electrode and a surface of said [protective portion] insulator are planarized to be flush with each other.

37.(Amended) A self-light-emitting device according to claim 4, wherein a surface of said pixel electrode and a surface of said [protective portion] insulator are planarized to be flush with each other.

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38.(Amended) A self-light-emitting device according to claim 5, wherein surfaces of said pixel electrodes and surfaces of said [protective portion] insulator are planarized to be flush with each other.

Please add the following new claims:

43.(New) An electric equipment, which uses a self-light-emitting device according to claim 11, as a display portion or a light source.

44.(New) An electric equipment, which uses a self-light-emitting device according to claim 15, as a display portion or a light source.

45.(New) An electric equipment, which uses a self-light-emitting device according to claim 22, as a display portion or a light source.

46.(New) The self-light-emitting device according to claim 1 wherein said self-light emitting device is a passive display device.

47.(New) The self-light-emitting device according to claim 2 wherein said self-light emitting device is a passive display device.

48.(New) The self-light-emitting device according to claim 3 wherein said self-light emitting device is a passive display device.

49.(New) The self-light-emitting device according to claim 4 wherein said self-light emitting device is a passive display device.

50.(New) The self-light-emitting device according to claim 5 wherein said self-light-emitting device is a passive display device.

51.(New) The self-light-emitting device according to claim 15 wherein said self-light-emitting device is a passive display device.

52.(New) The self-light-emitting device according to claim 22 wherein said self-light-emitting device is a passive display device.

53.(New) The self-light-emitting device according to claim 1 wherein said light emitting layer comprises at least an organic material.

54.(New) The self-light-emitting device according to claim 2 wherein said light emitting layer comprises at least an organic material.

55.(New) The self-light-emitting device according to claim 3 wherein said light emitting layer comprises at least an organic material.

56.(New) The self-light-emitting device according to claim 4 wherein said light emitting layer comprises at least an organic material.

57.(New) The self-light-emitting device according to claim 5 wherein said light emitting layer comprises at least an organic material.

58.(New) The self-light-emitting device according to claim 1 wherein said TFT is formed within a silicon substrate.

59.(New) The self-light-emitting device according to claim 2 wherein said TFT is formed within a silicon substrate.

60.(New) The self-light-emitting device according to claim 3 wherein said TFT is formed within a silicon substrate.

61.(New) The self-light-emitting device according to claim 4 wherein said TFT is formed within a silicon substrate.

62.(New) The self-light-emitting device according to claim 5 wherein said TFTs are within a silicon substrate.

63.(New) The self-light-emitting device according to claim 11 wherein a surface of said insulating layer is substantially flush with surfaces of said at least two first electrodes.

64. (New) The self-light-emitting device according to claim 11 wherein said first electrodes function as a cathode while said second electrode functions as an anode.

65. (New) A self-light-emitting device according to claim 1,
wherein the organic resin comprises a material selected from the group consisting of acrylic resin, polyimide resin, a polyamide resin.

66. (New) A self-light-emitting device according to claim 2,
wherein the organic resin comprises a material selected from the group consisting of acrylic resin, polyimide resin, a polyamide resin.

67. (New) A self-light-emitting device according to claim 3,
wherein the organic resin comprises a material selected from the group consisting of acrylic resin, polyimide resin, a polyamide resin.

68. (New) A self-light-emitting device according to claim 4,
wherein the organic resin comprises a material selected from the group consisting of acrylic resin, polyimide resin, a polyamide resin.

69. (New) A self-light-emitting device according to claim 15,
wherein the organic resin comprises a material selected from the group consisting of acrylic resin, polyimide resin, a polyamide resin.

70. (New) A self-light-emitting device according to claim 1,
wherein the organic resin comprises a resin containing a high molecular compound of
siloxane.

71. (New) A self-light-emitting device according to claim 2,
wherein the organic resin comprises a resin containing a high molecular compound of
siloxane.

72. (New) A self-light-emitting device according to claim 3,
wherein the organic resin comprises a resin containing a high molecular compound of
siloxane.

73. (New) A self-light-emitting device according to claim 4,
wherein the organic resin comprises a resin containing a high molecular compound of
siloxane.

74. (New) A self-light-emitting device according to claim 15,
wherein the organic resin comprises a resin containing a high molecular compound of
siloxane.

75. (New) A self-light-emitting device according to claim 1,
wherein the organic resin comprises CYCLOTEN.

76. (New) A self-light-emitting device according to claim 2,
wherein the organic resin comprises CYCLOTEN.

77. (New) A self-light-emitting device according to claim 3,
wherein the organic resin comprises CYCLOTEN.

78. (New) A self-light-emitting device according to claim 4,
wherein the organic resin comprises CYCLOTEN.

79. (New) A self-light-emitting device according to claim 15,
wherein the organic resin comprises CYCLOTEN.

80. (New) A self-light-emitting device according to claim 1,
wherein the viscosity of the organic resin is 10^{-3} Pa · s to 10^{-1} Pa · s.

81. (New) A self-light-emitting device according to claim 2,
wherein the viscosity of the organic resin is 10^{-3} Pa · s to 10^{-1} Pa · s.

82. (New) A self-light-emitting device according to claim 3,
wherein the viscosity of the organic resin is 10^{-3} Pa · s to 10^{-1} Pa · s.

83. (New) A self-light-emitting device according to claim 4,
wherein the viscosity of the organic resin is 10^{-3} Pa · s to 10^{-1} Pa · s.

84. (New) A self-light-emitting device according to claim 15,
wherein the viscosity of the organic resin is 10^{-3} Pa · s to 10^{-1} Pa · s.